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THE DIFFERENTIAL DIAGNOSIS BETWEEN TRACHOMA AND FOLLICULAR CONJUNCTIVITIS.

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There are two diseases of the conjunctiva which are characterized by the formation of granules in this membrane and which are often confounded under the name of "granular lids." The one occurs, as a rule, in childhood, is amenable to treatment and is but a slight affection. The other is an infectious disease, occurring indiscriminately in children or in adults, is difficult to eradicate and if left to itself may even destroy the eye.

Yet the innocent follicles of follicular conjunctivitis are often stigmatized by the term applied to the roughened lids of trachoma. Hence epidemics of "granular ophthalmia" in our schools and institutions have been reported by one physician where another would have diagnosed the greater majority as cases of follicular conjunctivitis. In the examination of a number of our Milwaukee schools in which are a great num-

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ber of children of foreign parentage, I found but few cases of trachoma, while the follicular disease was relatively common. In this region trachoma seems to be much more prevalent than in other parts of this country, probably on account of our large foreign population. Both these diseases occur in ill-fed and anæmic individuals who live or work in poorly ventilated or unhygienic rooms and surroundings, but trachoma attacks all ages and conditions while follicular conjunctivitis is essentially a disease of the young or anæmic. The negro, however, is markedly exempt from trachoma, though many examples of the follicular affection may be found. In the course of four years attendance at two of the charitable institutions in Washington as assistant in the eye clinics where there was a large negro attendance, I can call to mind but two or three cases of undoubted trachoma in this race.

"Trachoma embraces a variety of infectious conditions whose characteristic is hypertrophy of the conjunctiva either in disseminated spots or diffuse, accompanied by the occurrence in the membrane of distinct granules of various sizes and which may or may not be accompanied by inflammation."[1]

These granules are small, rounded, yellowish masses consisting of lymphoid and connective tissue cells surrounded by a fibrous capsule. They resemble masses of frog spawn and are embedded in the adenoid tissues of the conjunctiva and are surrounded by a vascular network. The conjunctival tissue is hypertrophied and rough, hence the name trachoma (*trachys*, rough). The disease is chronic in its nature and during its entire course and in all of its forms is infectious. For practical purposes it may be termed acute and chronic.

In acute trachoma there is great swelling, great hypertrophy, severe pain and a watery discharge, similar to the first stages of gonorrhœal ophthalmia, from which it is to be differentiated by its history and by the fact that in this disease at the early stage, the cornea is seldom implicated, while in the latter this structure is soon affected. Follicular conjunctivitis is never so

[1]Noyes, "Diseases of the Eye," 1890, p. 315.

severe even when acute. This condition in the course of several weeks merges into the chronic form with lymphoid infiltration.

Two forms of chronic trachoma may be distinguished. In the one, on everting the lids we find little sago-like bodies, the size of a millet seed, lying beneath the conjunctiva principally upon the upper lid at the retrotarsal fold. These give rise to but little irritation and are accompanied by slight hypertrophy of tissue. This condition may be aptly termed follicular trachoma. (See Fig. 18).

FIG. 18.—FOLLICULAR TRACHOMA.

The second form is characterized by the occurrence of the trachoma bodies accompanied by great hypertrophy of tissue, either diffuse or limited to the neighborhood of the granulations. As a rule, the surrounding conjunctiva is greatly roughened. This condition is called trachoma with lymphoid infiltration.[2] (See Fig. 19).

This form ultimates in grave changes in the lids and in the conjunctiva itself, producing a vascular opacity of the cornea which is caused by the mechanical irritation of the roughened lids (Fig. 20 A). Cicatrices follow the absorption of the granules and in old cases the conjunctiva is full of scars. The

[2]Id, p. 318.

cartilages of the lids become curved and distorted so that eventually trichiasis and entropion are produced. If so far the cornea has escaped danger from the roughened conjunctiva, it soon becomes opaque from the friction of the eyelashes and cicatrices, unless relieved by an operation, (Fig. 20 B). In old cases but few trachoma bodies may be seen.

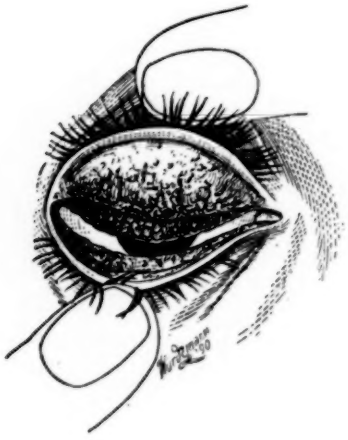

FIG. 19.—TRACHOMA WITH LYMPHOID INFILTRATION.

In all forms of this disease a great number of micro-organisms are to be found in the secretion, which is highly infectious, producing in other eyes the specific infection and causing suppuration in other parts of the body. Medical attendants or midwives who are themselves afflicted with this complaint, are themselves responsible for many cases of puerperal fever. I call to mind several instances of this affection in the persons of nurses and medical men who seem to have more than their share of this class of cases. The exciting cause of trachoma is supposed to be a diplococcus. In the examination of a large number of cultures I have noticed a number of organisms:—a diplococcus, as figured by Michel,[3] a bacillus

[3]Arch. of Ophth., 1886, p, 452.

about half the size of the bacillus tuberculosis but differing from it in the manner of growth, etc.; the pyogenic, the saprophytic and other forms. Pure cultures were obtained in several instances of the first two from the original inoculated.

The other disease that I have to discuss is characterized simply by follicular enlargement without hypertrophy of the

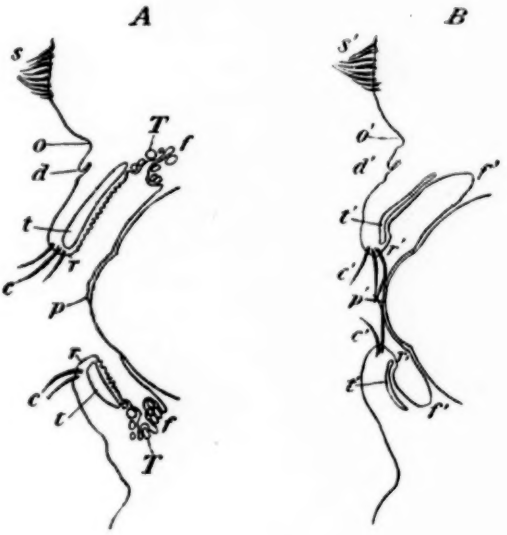

FIG. 20.—DIAGRAMMATIC SECTION THROUGH THE LIDS AND EYEBALL.

[*Adapted from Fuchs.*]

A from a case of short standing; *B* from an old case. *A* shows the two forms of hypertrophy; *B* the results of absorption of the granules; *s*, *s'*, supercilia; *o*, *o'*, sulcus between brow and lid; *d*, *d'*, fold of lid; *c*, cilia in proper position; *c'*, cilia turned against the cornea; *r*, free edge of lid, the upper and lower lids parallel, with sharp inner edges; *r'* free edge of lid bent backward, the inner edge rounded; *t*, tarsal cartilage, swollen through infiltration and covered by velvety conjunctiva; *t'*, tarsus atrophied and distorted, covered by smooth membrane; *f*, fornix, with many trachoma bodies, *T*, in the fold of the conjunctiva; *f'* fornix, smooth, without folds; *p*, thick pannus, covering the upper half of the cornea; *p'* shrunken pannus, covering the whole cornea.

surrounding conjunctiva, and is accompanied, as a rule, with but little irritation. These follicles appear as whitish-pink or yellowish, prominent, half round or oval, translucent elevations above the conjunctival surface. They are commonly found near the outer canthus and generally only on the lower lid, although sometimes a few may be seen along the retrotarsal fold. The follicles of Krause are also implicated, but are not alone affected, as the disease sometimes extends beyond their locality. These follicular swellings are about the size of a pin's head and are usually arranged in rows. The disease is essentially chronic and is supposed to be due to malarial infection.[4]

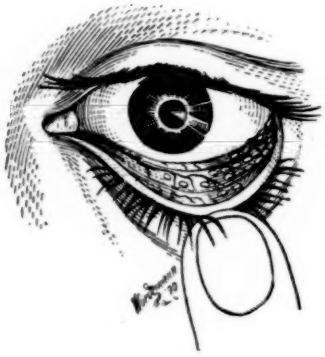

FIG. 21.—FOLLICULAR CONJUNCTIVITIS.

It sometimes follows acute catarrhal conjunctivitis and has been reported from the prolonged instillation of atropine solutions and other collyria. Pannus or any other sequelæ like those of trachoma never result from this affection. It tends to a spontaneous cure upon the restoration of the health or the approach of the vital periods. Follicular catarrh is supposed to be non-contagious. In the examination of a

[4]Fuchs, Augenheilkunde, 1889, p. 55. Schmidt-Rimpler, Augenheilkunde, 1889, p. 436.

number of cultures made from the secretion of the disease I only found the micro-organisms obtainable from any eye in which the conjunctiva was not in a state of perfect health.

To recapitulate, the principal points of variance are: Trachoma is a strongly contagious disease, whose sequelæ and complications are dangerous to vision and the safety of the eye. Its progress is ever from bad to worse and treatment is always prolonged and tedious.

Follicular conjunctivitis is a mild affection, feebly or non-contagious, and is attended by no dangerous complications. It tends to spontaneous cure and resolution quickly follows proper treatment. The granulations of trachoma are larger, less prominent and more yellowish, and their edges are less distinctly defined than are the granules of follicular catarrh. Cicatrices and pannus are never found in the latter disease at any stage, while their occurrence is the inevitable consequence of the former.

In but few cases may the diagnosis be in doubt, still, for instance, follicular catarrh may be accompanied by considerable inflammation of the membrane and simulate acute trachoma, however, the progress of the affection will soon reveal its true nature. Again, both diseases may exist together in the same eye, then the condition should be called by the name of the more grave complaint and measures taken accordingly.[5] From this condition, which is not uncommon, the two diseases have been almost universally confused by American and English writers under the term of granular lids, the authors asserting that follicular catarrh is but a mild form of trachoma, although in recent text-books there seems to be some disposition to keep them apart.[6]

A recent writer upon the subject of trachoma, states: "By many its recognition is considered so easy that the flippant diagnosis of granular lids is made to cover errors of refraction, intra-ocular troubles, simple, catarrhal and purulent

[5]Fuchs, Augenheilkunde, p. 89.

[6]Noyes, Diseases of the Eye, p. 317. Nettleship, et al.

conjunctivitis, corneal ulcerations, inflammation of the iris, and in fact it is confounded with almost every trouble to which the eye is subject; standing as a scape-goat in eye troubles, as a convenient appellation of malaria does in general diseases."[7] From experience I am forced to agree with the writer.

Other diseased conditions may be mistaken for trachoma, but they are fortunately rare, and they are even more dangerous for the safety of sight. One of these is lupus, and another is tuberculosis of the conjunctiva. In both instances the formation of symblepharon occurs and in the latter tubercles may be found as good-sized elevations upon and in the conjunctiva. The constitutional symptoms and microscopic examination will further the diagnosis.

[7]Barton Pitts, M.D., "Trachoma," Amer. Journ. Ophth., April, 1890.

DIFFERENTIAL DIAGNOSIS OF OPACITIES IN THE EYE.

Some Mistakes Common to Such Writers as Loring, Mauthner, Schmidt-Rimpler or Clayborne.

BY DAVID W. STEVENSON, M.D.,
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Loring, who has probably written the best work in English on the Ophthalmoscope, gives a chapter (p. 184) to the above subject. In order to save the reader looking up, I will number some of his quotations which we consider untenable. Referring to Mauthner's delicate test with the corneal reflex he states:—

1. "The visual line of the observer will pass through the centre of the reflex and also through the centre of *motion* of the observed eye. These two points will, therefore, act as fixed points, and *always* lie in the visual line of the observer."

2. "If the reflex covers the opacity, notwithstanding the various movements of the eye, then the opacity must lie at the very centre of the eye."

3. Allowing the above to be true, Mauthner decides the relative position of opacities on the axial line in retinits pigmentosa, and Loring suspects the relative position of the minute spot in high myopia.

4. J. Herbert Clairborne, in his neat and excellent little work on the ophthalmoscope, makes the ridiculous statement (hardly excusable in this age of exact ophthalmoscopy) on page 33: "Whenever the ball moves, the lens moves with it, and any point situated on the posterior surface of the lens moves with a corresponding point situated on posterior surface of the ball—*vice versa* anterior."

Most observers in thus using the opthalmoscope, standing 2 feet off, move their own heads, instead of having the patients move their eyes (which they would do in an irregular jerking fashion). It must, therefore, be plain when the patient keeps his eye still, that the *center of rotation* has little or nothing to do with the *relative* movement of opacities. To illustrate, place 3 or more pins in a small board, or rather stick them into a paper matchbox so that their heads will be one-half inch apart and all in a line. In this experiment it will soon be seen that it does not signify whether the box is moved or the observer moves as far as the relative movement of the pins is concerned. If the furthest pin is looked at (that is its image is fixed on the fovea), the other pins will appear to move in concert in one direction. The nearest pin appearing to travel the fastest, *their relative rate of movement will be as the images move across the retina.*

If the middle pin is *fixed on*, the farther pin or pins will appear to move with the observer, while the nearer will move against him. The one the eye fixes on will not appear to move at all. It will thus be seen that all the movements are only apparent and relative. To better illustrate this in regard to the eye, let the ordinary objective convex lens (say 3-inch focus) be fixed on the box before the pins. The nearer the pins are to the focus the more enlarged they appear, but the same law will be seen to hold good, except if one of the pins is placed beyond the focus; it would then act as if myopic. This pin would then form an inverted image in front of the lens. It would thus act in *relation* to its movements as if it was the nearest pin. A still greater myopic would act as if a little further from the observer. Now, as to the eye, I believe most observers fix on the inner edge of the iris. Therefore this becomes the point of fixation. Of course the observer can fix on a leucoma, or on anterior or posterior cataract, but probably he can't tell where the posterior cataract is situated. If he fix on a retinal vessel he ought to know the refraction. I may state that the centre of rotation is never fixed on, because there is nothing to fix and even if there was, there would be no way of knowing

it except by having some form of fixed ophthalmoscope. The patient's head would have to be immovable and the line of sight controlled by cross-wires as in a theodolite or Javal's ophthalmometer. In this way it might be possible to fix the centre of rotation when the patient's head is perfectly immovable. But this would be of no practical value.

Now, as to the corneal reflex which we believe if its relative movements are understood will be of practical scientific value. It will be a surprise to those who have not noticed it, what a small and distinct image is formed by the anterior convex surface of the cornea acting as a mirror. It appears to be near the plane of the iris, it being virtual and erect. The formation of the corneal image is as shown in Fig. 22. As will be seen in

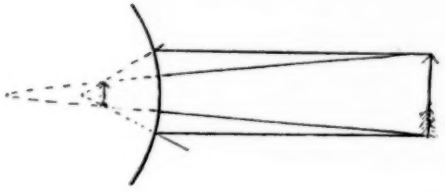

FIG. 22.

Ganot's Physics, with parallel rays the principal focus is approximately at the centre of the radius of curvature. I also quote from Ganot (p. 494) two of the simple laws in regard to mirrors. (*a*) The angle of reflection is equal to the angle of incidence. (*b*) The incident and reflected ray are both in the same plane, which is perpendicular to the reflecting surface.

Suppose an observer with a small, plane mirror with a perforation (the ordinary ophthalmoscope mirror will give as good results) reflecting parallel rays of light as those from the sun into the eye. From the above laws the observer's eye, the small image and the *centre of curvature of the anterior corneal curve* are all in the same line, because they are all in the normal to the tangent plane of the cornea. To this it may be

objected that the cornea is not a sphere (Landolt, p. 117). But for all practical purposes it may be considered so. As an *axiom* we may state that *the centre of rotation for the corneal reflex is the centre of the anterior corneal curve.* The radius of the front surface is 7.7 mm. (Noyes, p. 2). This point lies just posterior to the lens, less than $^1/_2$ mm. from it. (Landolt). Therefore, a very slight deposit on the axis of the posterior capsule would always act as centre of rotation for corneal reflex or image. An opacity anterior to this would move against the reflex or observer, while of posterior just opposite or with the observer. Loring states (this is the fourth error on page 187):

5. "The delicacy of this test in regard to the lens depends on the fact that the centre of motion is not really in the centre of the visual axis,but, according to Donders, 1.77 mm. behind."

I asked one of the best opthalmologists of Chicago the reason. He claimed that a posterior cataract would make more movement in the same direction than an opacity in the vitreous and that the centre of rotation being further back made it more apparent. It seems to me it would have just the opposite effect. If two objects are a certain distance apart the nearer they are the centre of rotation, their relative position can be more easily told. His idea being the same as Loring's in regard to the corneal reflex, his statement that he could diagnose between opacities in the vitreous and lens by a swifter movement in the lens I must sincerely doubt. The delicacy of this method really depends on the fact that the centre of the corneal curve is so very near the posterior capsule. If this *method* was to receive a name it would be well to give it the name Keratoscopy so unfortunately given by Cuignet to the shadow (light) test or retinoscopy. It may be said that by the direct method, the refractive difference would give the differential diagnosis between the lens and the vitreous opacities. But I never heard of one who claimed he could decide. We believe this *method* of the corneal reflex contains a great truth.

A CASE OF MALIGNANT FIBROID OF THE ORBIT.

JOHN DUNN, M.D., RICHMOND, VA.

The patient, a full-blooded negro, æt. 19 years, came Nov. 6, 1890, to the clinic of the Richmond Eye, Ear and Throat Infirmary. He had a growth protruding from between the lids of his left eye. This growth had made its appearance about nine months before, the patient being then 18 $^{1}/_{2}$ years of age. The negro said that in July, 1890, the growth had been partially removed, not entirely, for he had been told that a small piece of it still remained. Since July the tumor had grown so rapidly that the day the negro came to the clinic it completely filled the interpalpebral space, and the eyeball could be seen only by raising the upper lid. Examination of the tumor showed that it consisted of two parts, an encapsulated central part and its prolongations along the conjunctiva and subconjunctival tissue of the lower cul-de-sac. The encapsulated portion was about the size of a hickory nut, and opening from the orbit below the eyeball, which it pressed upward and backward, and the movements of which it greatly hindered. The lower half of this central part protruded from between the lids and pressed so firmly against the inner canthus that the caruncle could not be seen. The prolongations from the surface of the main body of the growth had completely filled the lower cul-de-sac of the conjunctiva to within a few mm. of the outer canthus. The channel of growth for the tumor had plainly been the conjunctiva and subconjunctival tissue of the lower cul-de-sac; for though these were so infiltrated and thickened that they protruded from between the lids, neither the cutaneous surface of the lid, nor the conjunctiva, for a dis-

tance of 4 or 5 mm. from the margin of the lid, showed any sign of tumor infiltration. The eyeball was perfectly healthy; so was the upper half of the ocular conjunctiva and the conjunctiva below immediately adjacent to the cornea. Centrally below, however, were seen running from the tumor to the edge of the cornea perhaps half a dozen small blood-vessels; these were all within a space of 6 mm. breadth. The surface of the tumor was red, rough, and, in places, warty, and was covered with a copious, dirty, purulent secretion. The tumor, though not painful in itself, was very sensitive to the least pressure, even when made through the lids.

Under cocaine, a small portion of the tumor was removed for microscopic examination, and patient was told to return in two days. The microscopic examination was unsatisfactory.

On November 8, the patient returned. The growth was perceptibly larger than it was two days before. The band of conjunctiva in which, November 6, were seen the small blood-vessels that extended from the growth to the corneal margin, was now a band of tissue, corresponding exactly in appearance with the main tumor surface. This band reached to the edge of the cornea, and there seemed to bend on itself. The eyeball was, except for the attachment of this band to it, perfectly healthy, and the question arose whether or not it should be sacrificed in the attempt to remove the tumor. The rapid growth of the tumor made it a matter of first importance that it should be removed, if possible, in its extremest prolongations. To do this it would be necessary to remove the whole of the lower half of the ocular conjunctiva, the whole of the conjunctiva of the lower cul-de-sac and of the lower lid and of the orbital tissue, an amount to be determined only by removal of the tumor. Although it seemed highly probable that no part of the tumor had attacked the periosteum of the orbit, this could not, on account of the size and immovability of the outer half, the non-capsulated part of the tumor, be certainly determined. Thus a large part of the covering of the eye would have to be taken away, and it was thought best to remove the eye with the tumor. An external canthotomy was

done; then the conjunctiva of the upper half of the ball was cut as in an enucleation, and then the tendons of all the muscles except the inferior rectus were cut. The nerve was next severed, and then the eye and the tumor were turned out of the orbit from above, after which no trouble was had in removing the growth in what seemed its entirety. The main body of the tumor had the following measurements: From above downward, 32 mm., length, 25 mm., from before backward, 15 mm. The lower two-thirds of this part were enclosed in a thick connective tissue capsule, and thus separated from the surrounding tissues. The outer part of tumor which sprung from the main body had no definite capsule, but had grown along the inferior cul-de-sac, growing forward and outward, and showing no tendency to spread into the deeper tissues of the orbit. The tumor was found to be nowhere adherent to the eyeball, save by the band extending to the corneal margin. This band, however, proved to be thicker than it had appeared to be. The negro, who was a sailor, came to the clinic to have his eye dressed only for four days, after which time he joined his vessel, and I have been unable to learn whether or not there has been any return of the growth.

The tumor presented several interesting points. In the first place, what was its true nature? I have ventured to call it a malignant fibroid, because though I made many sections, some of which were prepared with the single, others with the double staining method, I was unable to find anything that would allow me to name it otherwise. Some of the sections proved in part to consist entirely of bands of fibrous tissue and of individual fibrillæ, with no cells. Other sections showed a fibrous tissue basis infiltrated with great quantities of very small round cells, such as are seen adjacent to the epithelial prolongations in cancer.

Parts of other sections consisted of small round cells, though these were much larger than those mentioned above. Nowhere could I find definite spindle cells, nor epithelial nests, nor could I make out anything that could be taken for epithelial prolongations. Possibly we have to do with a fibro-sarcoma,

since part of the growth showed quantities of cells which had definite outlines, and which were numerous in proportion to the lack of the fibrous tissue basis. It is highly probable that the tumor was originally purely fibrous in character; the microscopic examination points to this, and also the fact that the main body of the tumor, though springing from the orbit, was completely isolated by a dense connective tissue capsule from the surrounding tissues. If a sarcoma, the age of the patient, $18^{1}/_{2}$ years, is to be noted. The willingness of the tumor to grow along the inferior cul-de-sac, where the sub-conjunctival connective tissue has a certain degree of looseness, and its slowness in attacking the conjunctiva where it is bound down more closely, as at the cornea and the margin of the lids, seem to point to the sub-conjunctival connective tissue, rather than to the conjunctiva itself, as its channels of growth.

If, as is highly probable, the tumor was a fibroid of the orbit, it shows what may be expected where after operation for the removal of such tumors, a part of growth has been left behind.

TRANSLATION.

SUCCESSFUL TREATMENT OF TWO CASES OF BUPHTHALMUS.

BY DR. STOLTING, OF HANOVER.

Translated by Casey A Wood, M.D., of Chicago.

What might generally be meant by the above title is, that as a result of treatment, some degree of visual acuity finally remained, but I wish it to be understood that in the two cases whose histories are here presented the result was, so far as could be determined in the case of children of tender years, a complete and permanent cure with the retention of very good vision. In the very nature of things, when the enlargement of the eye has reached a certain degree, it can never return to its normal size. We must, then, be content with bringing about a diminution of the corneal diameter, and with it a permanent reduction of the intra-ocular tension.

The first of these patients, Max B., æt. 7 months, came under my care on December 6, 1888. The peculiar redness and the lack-lustre appearance of the left eye had attracted the attention of the family physician. The well known picture of the smoky cornea and the pericorneal injection led me to try the ocular tension, especially since an enlargement of the eye in this case made me all the more suspicious that a glaucomatous process was at the bottom of the trouble. There was increased tension. There was at this time nothing abnormal to be made out on the right side, except a slightly increased corneal enlargement. The family history of the little patient fur-

nished nothing of importance; both parents and an elder sister had perfectly healthy eyes. More distant relatives had had no ocular affection which could in any way be connected with the case under discussion. To please the parents I tried the usual medical treatment for ten days. Then I did a sclerotomy, first on the left and afterward on the right side. The wound in the left eye healed without incident, but prolapse of the iris occurred on the right side in the nasal portion (counter puncture) of the sclerotomy wound. This prolapse did not take place at the time of the operation, but came on three days later, its first indication being a pear shaped distortion of the pupil. It gradually increased in size during the first few weeks, but has now ceased to grow, remaining about as large as half a small lentil.

I was for the first fortnight in doubt as to the result of the operation, as during that time the tension fluctuated and was mostly increased. Henceforth it became normal and had so remained until date—a period of 18 months.

The second case, Alfred K., was less promising. The child was two years old, and the disease, of long standing, had brought about a very decided enlargement of the eye. The tension of both globes was considerably increased when I first saw him. The cornea was smoky; the child was very restless, and seemed to be mentally deficient. An upward sclerotomy was immediately done on both eyes, the left February 16, and the right, February 20, 1889. Tension was at first greatly decreased, but soon rose so high that the smokiness of the cornea re-appeared, and I felt obliged to repeat the operation on both eyes, March 6, and 19, respectively. I might mention, *en passant*, that I noticed during the progress of this case something which, it appears to me, has an important bearing upon the theory of the therapeutic action of sclerotomy. The higher the tension rose after the first operation the more the pupil (it was best seen on the right side) presented a bicornuate distortion toward the two scars. The periphery of the iris was in this manner gradually drawn away, and this not while the anterior chamber was wanting but after it had been

completely restored to its normal depth. The phenomenon can be explained in only one way. There must have been an escape of fluid through the recent cicatrices. This is rendered all the more probable by the fact that after the second operation and the decrease of tension, this distortion of the pupil disappeared and did not return.

The final result was, as above indicated, in every way satisfactory.

The decrease in the size of the cornea seemed to me a most remarkable occurrence, and is, moreover, mentioned by almost all observers.

While in case I, with the exception of the prolapsed iris in the right eye, there was nothing remarkable to be seen, and although the left eye (apart from the very moderate corneal enlargement—12 mm.) would be pronounced a normal one by every oculist, with the second case it is different. The ocular changes in this case are still such as to indicate the ravages of the disease. The corneal diameter measures 14 mm., and some fine opacities, which might be likened to the remains of a well-healed interstitial keratitis, can be made out in it by focal illumination. Both children readily find needles thrown upon the floor, and the parents repeatedly state that their vision is perfectly good. Excavations of the disk have not formed in either case. There has since been no increased tension, nor has there been any return of the corneal cloudiness.

To the unusually careful nursing which both patients received after the operation I partly attribute this happy result. For months the children were kept by their attentive parents in a moderately darkened room, and the application of moist heat and the use of myotics were faithfully carried out.

Speaking of the iris prolapse noticed in the case of the first child, I might say that this word hardly describes the condition present. It is really a mixture of prolapse of the iris and cystoid cicatrix, for while in the anterior half of the scar the iris is involved, there is no area in the posterior portion which is covered by conjunctiva.

That the observations made in the case just described render it certain that filtration through scar tissue is what occurs after operations upon glaucomatous eyes seems to me to be beyond cavil, and I find in them support to the proposition which I advocated in vol. 33, II, 210 of these archives.[1]

If sclerotomy has in common with iridectomy the property of making filtration possible in buphthalmos, it is superior to the latter for another reason. Mauthner mentions this. He states that iridectomy in buphthalmos has its disadvantages. In the first place the vitreous may easily escape through the stretched and pervious zonula of Zinn. If the operator makes an incision of the ordinary length (6-7 mm.) he cannot remove a sufficiently large piece; if he makes a larger, longer one, he increases still more the danger from loss of vitreous. I might add another valid objection to iridectomy. The iris as a complete diaphragm acts the part of a defence for the lens during the changes incident to accommodation; it guards in buphthalmic eyes against trembling (Schlottern) of the lens, which it lessens when it cannot be altogether prevented. We surrender most of this advantage when we cut through the sphincter iridis. There can be no doubt but that a mobile lens is a cause of irritation of the choroid. One must not forget, too, another advantage of sclerotomy; it can not easily fail as an operation, and under all circumstances the wound heals readily. It is just here that a very important point in the cure of buphthalmos must be considered; if the aqueous is allowed to flow away too rapidly, dangerous intra-ocular bleeding may occur. For this operation children, as Dufour pointed out, should be put under the influence of an anæsthetic.[2] When profoundly asleep puncture and counter-puncture must be made, the aqueous allowed to flow off slowly and the bandage applied while there is no resistance from an unquiet patient. Finally, especially careful nursing must be provided if one wishes to guard against accidents.

[1]Die Lehre vom Glaucom, S. 251.

[2]Dufour. Beiträge zur Ophthalmologie als Festgabe f. Fried. Horner, s. 113.

The author who may fairly claim to have been the first to consider buphthalmos as glaucoma is Mauthner.[3] This doctrine has become better known through Muralt's work in Horner's clinic.[4] While we recognize the great value of the work done by both these authors, we must add that Dufour removed the last doubt as to the true nature of the disease—that we have to deal with a genuine primary glaucoma, differing in no respect from the same disease in adults, except, possibly, in the elasticity of the ocular coats due to age.

We shall the sooner appreciate the difference between the two positions taken as to the character of the disease by quotations from the various authorities. Von Muralt writes (p. 52): "The origin of *cornea globosa* (*opaca*) cannot be determined although it appears to me that the corneal opacity (Muralt distinguishes *cornea globosa semper pellucida* from *cornea globosa opaca*) points to an intra-uterine affection of the cornea, in consequence of which the corneal tissue (without having necessarily suffered in its entirety) no longer possessed the normal resistance. On the other hand I am inclined to regard keratoglobus, with its invariably transparent cornea, as a malformation, *i. e.*, the thin, undeveloped cornea has allowed of stretching, even when the intra-ocular tension had not been raised." P. 53: "The question to be settled is this: Is the primary process an increased intraocular pressure, giving rise to stretching of the cornea and all the other symptoms, or is the cornea globosa the initial lesion and the cause (through stretching of its own nerve supply) of the increase of tension with the other symptoms of secondary glaucoma, such as one sees so distinctly in the advanced stages of hydrophthalmos? In this connection it may be affirmed that although increased intra-ocular pressure may be able to impart a globular shape to the cornea, and although the other parts of the eye may subsequently participate in this stretching, yet, on the other hand, our previous researches make it more probable

[3]Loc. cit., p. 47.

[4]Ueber Hydrophthalmos congen. von Muralt. Inaug. Diss. Zürich, 1869.

that the extreme hardness of the bulb, the excavation of the disk, etc., are of secondary origin, and that the first cause is a congenitally abnormal cornea."

Dufour, speaking of this plain statement that hydrophthalmos is of the nature of secondary glaucoma, remarks that there are but two considerations that could prevent us from regarding it as a primary affection: first, the imperfect closure of the filtration angle, and secondly, the deep anterior chamber. The first objection fails because we possess, as yet, no description of the pathological changes in hydrophthalmos, and the second may be met by reference to certain simple physical laws.

"*Je crois que l'affaiblissement de la Zonula de Zinn, qui résulte de la dilatation de l'ouverture sclerale, les lacunes peut-être de la zonula permettent aux pressions de s'èquilibrer absolument de façon à laisser à l'iris sa position normal.*"[5]

One would scarcely deny the assertion that the first objection to the idea of a primary glaucoma, viz., imperfect closure of the filtration angle, carries but little weight. Descriptions of pathological changes, the absence of which Dufour notes, are sufficiently sure, even at this date. These, in view of their etiological interest, we shall now consider.

First of all is Raab's[6] report, in 1876, of a case of buphthalmos with fairly good visual acuity; the child recognized a candle-flame at 15 feet. The results of the histological examination in this instance are all the more important because in our time we would not be at all likely to have such an eye for examination, since we would not consider it incurable and doom it to enucleation.

Without going too deeply into the details of Raab's report, I shall quote the conclusions he arrived at: "The pathological processes which bring about the secondary alterations present

[5]["I believe that the weakening of the zonula of Zinn that results from a stretching of the scleral coat-openings it may be in the zonula—allow of such a perfect distribution of the (intra-ocular) pressure that the iris retains its normal position."]

[6]Beiträge zur pathologischen Anatomie des Auges. Zehender's Monatsbl., 1876, p. 22.

have their chief seat, as well as their point of distribution, in the peripheral portion of the iris, and in those parts of the ciliary body lying next the limbus.

Here we find the traces of an inflammatory process, partly complete, partly active, which has affected the structures at the junction of cornea and sclera.

The well-known susceptibility of the ciliary body to inflammatory irritants (unlike the cornea and sclera), as well as the pathological alterations found in the first convince me that the primary seat of the inflammation is not in the corneal tissue, but in the uveal tract, and especially the extremely vascular corpus ciliare."

Schiess furnishes us with additional facts with which to arrive at a conclusion about this disputed question.[7] Since the patient, whose eye had been removed, was 27 years old, one may readily conclude from the examination where the original disease arose. It may, however be noted that the spaces of Fontana were obliterated by a tongue-like proliferation from the iris, and that the choroid appeared pretty generally atrophied. Of two other observations by the same author,[8] the first closely resembled the foregoing. The patient was 25 years old, and had been blind for nine years. In her case Horner had diagnosed hydrophthalmos from cyclitis three years before the enucleation. The second, a girl, æt. $7^1/_2$ years, had had an iridectomy performed (1862) for the ectasia. No benefit followed. Some weeks after an attempt was made to remove "the very hazy lens." During the operation the globe collapsed to one-half its former size, and although it filled out again shrinking finally set in. After excision the vitreous was found to be entirely fluid, together with the formation of thick bands of connective tissue in the ciliary body. It is chiefly this latter condition which the author is inclined to connect with hydrophthalmos.

[7]Schiess. Vier Fälle von angeborenen Anomalien des Auges. Arch. f. Ophth., Bd. xxx, 3, p. 191.

[8]Schiess, Arch. f. Ophth., Bd. ix, 3, p. 171.

After a very careful examination of a case of congenital hydrophthalmos in a child æt. 13 years, Grahamer[1] believes the primary process to be a uveitis—a cyclitis serosa. He regards the other changes as results of this, "that the narrowing of the lumen of Leber's venous plexus and the distortion of the spaces of Fontana produced by the stretching of the anterior scleral segment and cornea must be considered as a result of the increased tension. This is all the more intelligible since every reduction of the transverse section [of the veins] must necessarily be accompanied by a decrease in the outflow of the intra-ocular fluids." The author further notices that the thinning of the ciliary body was as advanced as that present in a high degree of myopia. I have myself made a similar observation in a case of glioma with secondary increase of tension and ectasia of the bulb. The atrophy of the ciliary body was in that case so marked that it appeared to be absent. Manz,[2] as a result of a post-mortem examination, believes congenital hydrophthalmos to be the sequence of a chronic inflammatory process in the choroid and ciliary body which, occuring during fœtal life, gives rise in the majority of instances to watery products.

Ophthalmoscopic examinations indicate the presence of these choroidal alterations. [3]Brunnhuber noticed in one of these cases numerous circumscribed (large and small) choroidal patches situated at some distance from the papilla. In the second eye, besides the hydrophthalmic condition there was irideremia—a state of affairs which will be noticed later. [4]Mellinger discovered distinct changes in the choroid. I have not been able to find any such fundus affections in my own cases.

[1]Grahamer, Beiträge zur pathologischen Anatomie des Hydrophthalmos congen. Archiv. f. Oph., xxx, 3, 265.

[2]Manz. Anatomische Beschreibung eines hydrophthalmos congen. Bericht der Naturforscherversammlung in Freiburg. S. 252.

[3]Brunnhuber, Klinische Monatsblätter f. Augenheilkunde, xv. s. 104.

[4]Mellinger. Zwei Fälle von Hydrophthalmos congen. Klin. Monatsblätter f. Augenheilkunde, xxv., 345.

Of those observers who hold the same opinion from a clinical standpoint, I may first mention Alexander.[5] "Whether congenital hydrophthalmos, or buphthalmos—the result of an intraocular choroiditis—be the outcome of syphilis or not, cannot be determined, as we have not a sufficient number of observations or certain evidence to show. I have been able to establish a history of syphilis in two out of five mothers who have borne buphthalmic children." Pflüger[6] speaks in a similar manner in his extremely interesting paper on the Glauser family. ["The mother of this famous family had a bilateral irideremia. The father was a drunkard. The eldest child—a boy, æt. 15 years—suffered from microphthalmos and congenital phthisis; one daughter, æt. 12 years, had a bilateral irideremia; the second daughter, æt. 9 years, was normal and the fourth child, æt. 6 years, had on the right side a well-developed and on the left a beginning hydrophthalmos. She also had a bilateral and total irideremia. An infant (boy), æt. 5 months, had bilateral and total irideremia"].

I shall not consider those cases which are not purely hydrophthalmic in character, but pass on to say that every scientific observer who has examined the disease in adults regards buphthalmos as an inflammatory affection of the uveal tract and especially of the anterior portions of the choroid.

Fairly often it has been recorded that several children in the same family suffer from this disease. Muralt mentions that Junken[7] refers to a Swedish family in which seven sons of the same father and mother suffered from hydrophthalmos although the parents and two sisters were absolutely healthy. Von Muralt himself records several such examples where in two instances two, and in two other cases three brothers and sisters suffered from this disease. Heredity was not an etiological factor in these cases; nor were the parents markedly myopic. There was no mention made of a family history of glaucoma

[5]Alexander. Syphilis und Auge. 194.

[6]Pflüger's Jahresbericht (1882) der Univers. Augenklinik in Bern.

[7]Dessen Handbuch, p. 541.

but no doubt it would have been mentioned had that disease been present.

So far as concerns the prognosis we may expect in the cases described above a favorable result. Horner's division of hydrophthalmos into *cornea globosa*, *kerato globus pellucidus*, and *keratoglobus turbidus*, the first alone being considered that in which vision may be preserved, can no longer be maintained. The fact of increased tension removes one case from the first category and makes it one with the second and third so far as the prognosis is concerned. The tension in that instance still remains the same and the perfectly clear cornea allows the hope that the eye had been free from increasing intra-ocular pressure during the later months of uterine life and that the disease is at a standstill and is cured.

Of the authors who express themselves unfavorably about the chances of successfully treating this disease I shall cite only Derby[8] and E. Meyer. The former thinks it is infrequent as it is hopeless. Meyer[9] says prognosis is very unfavorable "because almost complete loss of vision attends the progress of the disease, which has shown itself to be unaffected by any treatment." On the other hand Dufour[10] was, so far as I know, the first to state decidedly and definitely that if taken early enough an operation (iridectomy) would yield favorable results. "I believe," said he, "that especially if tried upon a case of hydrophthalmos in its earliest stage it will be followed by excellent results." Mauthner[11] expresses himself thus: "According to my opinion the operation (sclerotomy) should be made immediately after birth or at the beginning of the development of the disease. Waiting till the child grows older only allows it to make further ravages; the bulb increases abnormally in size and blindness is the certain result. On the other hand

[8]Derby.Archiv.f.Augenheilkunde, xiii, 1. Drei Fälle von Iridectomie bei Hydrophthalmos.

[9]Handbuch der Augenheilkunde. s. 115.

[10]L. c., p. 121.

[11]Lehre vom Glaucom., p. 252.

sclerotomy in the first stage of the process not only retards it but restores the eyeball quite or almost to the natural status."

The first favorable result of iridectomy is recorded by Muralt.[12] Both eyes of a child were operated upon by Horner; the color of the optic nerve improved; the tension decreased; the visual acuity was raised and the cornea became more transparent. No further history of the case appeared. After a considerable lapse of time, 1869–1882, Dufour followed with several good results of iridectomy performed on five children. In one case, a boy, æt. 7 years, vision rose from $^1/_{10}$ to $^1/_2$ and remained there until, when 16 years of age, it was lost from amotio retinæ. In the second case (æt. 6 months) the eye became visibly smaller, but unfortunately the little patient died shortly afterwards. In a third the tension became normal but the cornea did not clear up.

Mellinger's[13] second case also seems to have been favorably influenced by iridectomy although the prognosis was extremely unfavorable.

As opposed to these positive experiences the results of operations reported by Streatfield[14] and Pflüger[15] have a limited significance since they merely illustrate the great difficulties attending the treatment previously referred to. Moreover, Prof. Pflüger and Dr. Eissen both inform me that the treatment of hydrophthalmos in the klinik at Bern is more successful than formerly.

[12]L. c., p. 16.

[13]Mellinger. Klinische Monatsblätter, 1887, 347.

[14]Lancet, February, 1882. Observations on Some Congenital diseases of the Eye.

[15]L. c., p. 43.

SOCIETY PROCEEDINGS.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

THURSDAY, NOVEMBER 13, 1890.

HENRY POWERS, F.R.C.S., PRESIDENT, IN THE CHAIR.

OPERATIONS FOR PTOSIS.

Dr. Berry (Edinburgh) read a paper commenting on most of the known operations for ptosis, but especially upon the method employed by Eversbusch and that introduced by Snellen, and called by their names. He had performed Eversbusch's operation eleven times and Snellen's six times, but had not always been satisfied with the results. However, in any case of ptosis, which called for operation at all, he advised the performance of one of these two operations, because they were capable of producing at least as great an effect as any other operation and because they admitted of repetition if necessary, with a good chance of further improvement, or they might be followed by another operation, such as that devised by Panas.

The president mentioned cases in which he had shortened the tendon of the levator palpebræ.

Mr. Tatham Thompson (Cardiff) stated that he had not found the method advocated by Prof. Snellen effectual. In his own cases he had had recourse to subsequent shortening of the levator palpebræ by inserting threads.

Mr. Lang said that in cases where he had not tied the threads over a piece of drainage tube they had sunk into the

skin and caused the formation of small abscesses. Four cases had been operated upon, in all of which suppuration occurred. Lately he had adopted Panas' operation, employing, however, a curved incision instead of a flap, with excellent results.

Mr. Juler had employed the superficial subcutaneous suture in the method described by Pagenstecher with admirable results; particularly in his last three cases.

Mr. Mackinlay described a method employed by Mr. Hulke. A Graefe's knife was inserted at the outer extremity of the lid and passed along so as to separate the skin from the orbicularis muscle, the knife was then withdrawn and the skin puckered and maintained in a large wide fold. More recently he had himself preferred making three small folds instead of one broad one, and maintaining them by the insertion of stitches till the end of the second week. There had been no suppuration. The results were good, but when the affection was unileteral he had not seen complete symmetry restored.

Mr. McHardy thought they were in want of a really satisfactory operation to remedy a pitiable deformity such as ptosis. From his own experience he thought Pagenstecher's operation was the best.

Mr. Doyne mentioned three cases in which he had employed Snellen's operation, using three sutures. One had suppurated, but in all there was decided improvement. He thought that, considering how many structures were involved, perfect results could not reasonably be expected.

Dr. Berry briefly replied to the remarks of other members.

On Individual Difference in the Degree of Latent Lateral Deviations of the Eyes on Looking Upwards and Downwards.

Dr. Berry communicated the results of experiments he had made upon the students and others in reference to the point above mentioned, and illustrated his remarks by diagrams. The cases were all examined by Maddox's glass-rod, and of the total number (50), in nine the degree of convergence was the

same on upward as on downward fixation; in twenty-eight the degree of convergence was greater on downward fixation, and in thirteen it was greater on upward fixation. The main conclusion from the investigation was that increase in convergence downwards was only about twice as frequent as increase in convergence upwards. Dr. Berry referred to the increase in homonymous separation of the images in sixth nerve paralysis, which usually, though not invariably, occurred on looking down, and suggested that in these cases the increase might not be only the difference in latent deviations on upward and downward fixation, but also the difference in the effort made to unite the double images in the two positions.

Mr. Wray said that in cases of latent deviation, for the examination of which he employed Stevens' phorometer, he had generally discovered the inequality of visual acuity in the two eyes. He suggested that it would facilitate the comprehension of intricate subjects such as that under consideration if the members of the Society were supplied with an abstract of the paper beforehand.

Mr. Priestley Smith thought that Dr. Berry's paper and diagrams showed that there was not that close connection between downward movement of the eyes and convergence and the converse as was formerly supposed to exist. He thought, also, that the presence of latent deviation might account for the giddiness many people experienced in looking down from a height, and the vertigo and headache often experienced in looking up, for example, in picture galleries, for some time.

In reply, Dr. Berry stated that the experiments were all performed with the eyes directed to a distance of five métres, so as to ensure approximate parallelism of the optic axes. The question to be determined was, whether the phenomena described depended upon physiological or anatomical conditions.

Case of Double Hemianopsia.

Messrs. H. R. Swanzy and Louis Werner communicated this paper. They alluded to the experiments on the dog and

monkey by Munk and Schafer, which showed that there was a definite correlation between certain parts of the occipital lobes and the different segments of the retina. In man also the correlation was shown to exist in a case quoted by Dr. Henry Hun, in the *American Journal of Medical Sciences* for January, 1887, where, after an apoplectic seizure, a man lost the left lower quadrant in each field, owing to a lesion involving the lower half of the right cuneus, discovered at the necropsy two years later. This case went to prove that the fibres from the right upper quadrant in each retina terminated in the right cuneus, and that the fibres from the lower quadrant of each retina terminated in the right cuneus, or in the right gyrus lingualis, was rendered probable by a study of recorded cases. A similar relationship would of course exist between the left quadrants of each retina and the left cuneus and gyrus lingualis. The subject of the present communication was a man, æt. 42 years, who had an apoplectic seizure in February and was unconscious for three weeks. On his recovery he was unable to raise his left arm, gave contradictory accounts of himself, and had lost the right upper and both lower quadrants of each field. The remaining quadrant in the left field was accurately defined, but in the right extended a little into the left lower and right upper quadrant. The nature of the lesion was most probably hæmorrhage; and from the impossibility of indicating a position in which one lesion would be likely to produce hemianopsia and brachial monoplegia, the authors concluded that there were two distinct lesions in the right hemisphere. A lesion of the internal capsule involving arm and vision must have included the leg + sensation, which were not affected in this case. The paralysis of the arm was most likely due to a cortical lesion, judging from experience in other instances of monoplegia, and the loss of portions of the lower quadrant of the visual field was almost certainly due also to a cortical lesion, the only other situation which suggested itself being the optic radiations, where such a restricted invasion of the fibres was scarcely to be expected. Furthermore, in the light of Hun's case this lesion was in the

lower half of the right cuneus. The lesion in the left side of the brain causing loss of the right half of each field could not be localized with so great a degree of probability. The absence of concomitant symptoms referable to that side of the brain suggested its site in the optic tract, radiations, or cortex. The absence of the hemiopic pupil negatived its being in the tract, and the optic radiations were unlikely, for the reasons adduced above, hence the lesion was also probably cortical and situated in the left cuneus and gyrus lingualis.

Dr. Beevor thought that there must have been a double lesion, and referred to a somewhat similar case recorded by Dr. Hughes Bennett, in which after death two lesions were discovered, one in the internal capsule and one in the cuneus.

A Case of Hemianopsia.

Mr. Richard Williams (Liverpool) read an account of a miner, æt. 42 years, who exhibited neuro-retinitis and very marked horizontal limitation of the fields of vision. He remarked that cases of horizontal hemianopsia were by no means common, but the loss of the upper half of one field and the lower half of the other rendered the present case unique in medical literature, though the possibility of such a condition was suggested by Wilbrand.

A Case of Alexia.

Mr. Richard Williams described this case, occurring in a man, æt. 57 years. He could see words distinctly, but appeared as if beginning to learn to read, and could make no sense of them. He wrote readily from dictation, but could not afterwards read what he had written. After he had written part of a letter spontaneously, he was unable to read it, though he could recall the sense. Memory was somewhat defective, and he was more emotional than usual, but could say the names of surrounding objects without difficulty. The fields of vision presented the usual character of right homony-

mous hemianopsia, the blind line reaching to within about 10° of the point of fixation. Otherwise the appearance of the eyes was normal. Improvement was very slow and incomplete.—*Brit. Med. Jour.*

THE BOWMAN LECTURE.

The Bowman Lecture on "Sir William Bowman's Work in Relation to Ophthalmology" was delivered by Mr. J. W. Hulke. After some introductory remarks, he said that Sir W. Bowman had enjoyed a great advantage in having first practised general surgery before his attention became concentrated on ophthalmology. Another thing which gave him a great advantage over some of his contemporaries was the training in habits of close observation and reflection acquired during years of patient toil as a demonstrator of anatomy and in the prosecution of those microscopical researches which soon placed him among the foremost investigators of his time. The discovery of the muscularity of the body since known as the "ciliary muscle," made almost concurrently here by Bowman and in Germany by Brucke, laid the anatomical basis of a theory of "accommodation," which yet held good. The "Lectures on the Anatomy of the Parts Concerned in the Surgical Operations on the Eye," delivered by Sir William Bowman soon after his first connection with the Royal London Ophthalmic Hospital, and published in 1846 in the form of a book, admirably met the want fifty years ago of a sound treatise on the microscopic anatomy of the eye. The "anterior elastic lamina" of the cornea and the interstices in the corneal tissue there made known, soon received the familiar names of "Bowman's membrane," "Bowman's tubes." It was by Sir W. Bowman's enterprise that medical students in this metropolis had first placed within their reach the means of beginning the prosecution of original microscopical inquiry. In 1846 extremely few medical students possessed microscopes. Sir W.

Bowman met this want, in so far as it concerned the students of King's College, where he taught physiology jointly with Dr. Todd, by procuring from the firm of Nachet, of Paris, microscopes which cost only £5. The importation of these stimulated English makers to produce the cheap yet excellent instruments now so widely used; while Sir W. Bowman's teaching and example created a love of histological research, which had continued to extend. Passing from anatomy to the domain of practice, Mr. Hulke referred to improvements which had originated out of the practice of slitting up the lacrymal puncta and canaliculi devised by Sir William Bowman, first practised by him for epiphora due to displacement or closure of the puncta, and subsequently extended by him to the treatment of obstructions of the nasal duct and their consequence. This method, its development and its applications, were described in two papers, one published in the *Transactions of the Royal Medical and Chirurgical Society* for the year 1851, and the other six years later in the *Ophthalmic Hospital Reports*, vol. i, 1857. For dividing strictures of the canaliculi Sir W. Bowman devised a canula lancet, which was figured in the *Annales d'Oculistique*, vol. 1855-56. It was in principle a miniature urethrotome *cache*. For the operative treatment of ptosis, particularly of congenital forms, he devised a highly ingenious plan of looping up bundles of the orbicularis palpebrarum muscle, taken up with an extremely fine silk thread close to the free border of the lid, and of giving to these bundles a vertical direction by connecting the closed end of the muscular loop with the brow, through the mediation of the cicatricial band which should play the *role* of a minute "tendon of origin." He also adopted this procedure to the correction of entropion of the lower eyelid. The subcutaneous plan of operating for squint, devised by the late George Critchett, and elaborated in conjunction with him by Sir W. Bowman, was a great improvement upon the earlier method of a free section of the tendon with all the tissues overlying it. In connection with this subject Sir William Bowman devised a ready, and for most clinical purposes sufficiently accurate, way of apprais-

ing and recording the amount of deviation of the squinting eye, by noting the interval between the lower ends of two ideal vertical lines, dropped through the centre of the pupil upon the lower eyelid, one in the faulty, the other in the medium, position of the eye with reference to the lid. Another subject, in the operative treatment of which Sir William Bowman took much interest, was conical cornea. A paper on the subject was published by him in the *Ophthalmic Hospital Reports*, vol. ii, pp. 134-67, 1859. In the surgical treatment of cataract, discission, in the early years of Sir William Bowman's active service at the Royal London Ophthalmic Hospital, was much more widely employed than now. Mr. Hulke had notes of three cases in which Sir W. Bowman practised it in 1849, the ages of the patients being 60, 64 and 65 years. In the softer forms of cataract of early life discission still held its ground, but the relatively long time occupied in solution, even in the soft forms of cataract, must often have led surgeons to wish for some speedier way. Gibson sought to shorten the time occupied in solution by evacuating the lens, just broken up with a cutting nedle, through a small corneal incision made with the same needle with which he had comminuted the lens. For the more thorough removal of softened pulpy lens tissue slender channelled evacuators and also suction instruments were invented. Of suction instruments the two best adapted forms were tubes exhausted by the operator's mouth and syringes. Of the latter one of the best was the syringe devised by Sir William Bowman and bearing his name. This he used not merely for the removal of the opaque lens tissue by suction, but in a few instances he endeavored also to remove the last vestiges of lens by washing out the chambers with distilled water injected with the syringe. Gibson's linear extraction was a procedure in which Sir William Bowman felt much interest, and to the perfecting of which he gave much thought. The first demonstration of the true nature of the appearances exhibited by the form termed zonular or lamellar cataract was given by Sir W. Bowman, when Professor of Physiology in King's College, about the year 1846. Depression, which had

fallen into disuse, was, in 1854, revived by Sir W. Bowman, who, about that time tried it in several cases in the Royal London Ophthalmic Hospital. Larger experience of the operation, however, showed that not infrequently it was followed by an insidious cyclitis, promoted, apparently, by the presence of the displaced lens, and this persisted and implicated the other structures of the globe, in spite of treatment, and finally involved total loss of sight. This seemed one of the principal reasons why depression was soon again relinquished. The methodical combination of iridectomy with extraction, though a corneal incision of less extent than that made in the older flap method of extraction, effected by the aid of a traction instrument originated by A. von Graefe, was adopted in 1860 by Sir W. Bowman and his colleagues at the Royal London Ophthalmic Hospital. Sir W. Bowman's modification of the scoop and others, were figured in a paper published in vol. iv, 1865, *Ophthalmic Hospital Reports*, entitled "On Extraction of Cataract by a Traction Instrument, with Iridectomy, with Remarks on Capsular Obstructions." Extraction up to about the year 1850, in London, was performed generally in the manner now designated flap extraction, to distinguish it from a later procedure devised by A. von Graefe. It was performed under difficulties now known to few, and it certainly demanded much greater dexterity, for no speculum was used, but the operator himself raised and fixed the upper eyelid, his assistant depressing and fixing the lower lid; fixation forceps were not known, the eyeball was steadied only by the operator's fingertip applied at the nasal side of the globe in opposition to the pressure of the knife as this punctured and crossed the anterior chamber. Mr. Hulke said he had a vivid recollection of many such operations brilliantly executed by Sir. W. Bowman. In London Sir W. Bowman was, he believed, the first surgeon who employed chloroform in extraction. One inconvenience attending the use of Beer's knife—wrongly so called—in extraction, was the difficulty of making with it an uniformly curved, regular section of the cornea. With the narrower knife, devised by Sichel, the operator would regulate

the corneal incision with great nicety, and in Sir W. Bowman's hands this knife quickly replaced Beer's knife previously in general use. Later still, Sir W. Bowman used the yet more narrow knife known as Graefe's, and adopted the form of extraction which bore the name of that illustrious oculist. The inefficacy of pharmacal therapeutics to cure, or even to control, the conditions comprised under the general designation, "detached retina," "subretinal dropsy," must have often originated the idea of treating these accumulations of fluid directly by paracentesis. Some cases were so treated by Sir William Bowman at the Royal London Ophthalmic Hospital in 1864, but the results did not encourage an extensive trial of this method. A paper on this subject by Sir William Bowman appeared in the *Ophthalmic Hospital Reports*, vol. iv, p. 133, 1864. The epoch-marking paper on the "Treatment of Glaucoma by Iridectomy," communicated by Albrecht von Graefe to the International Congress on Ophthalmology at Brussels in 1857, excited Sir W. Bowman's deep interest, and he at once began at the Royal London Ophthalmic Hospital an extensive trial of the operation. His great example and influence, together with those of colleagues, soon won for it here the general assent it yet retained. His publications on the subject were papers on Iridectomy in Glaucoma, in *Medical Times and Gazette*, 1860; on Glaucomatous Affections and Their Treatment by Iridectomy, *British Medical Journal*, October 11, 1862; and Glaucoma and Iridectomy, *Ophthalmic Hospital Reports*, vol. iv, pp. 41-58, 1863. In connection with the subject of glaucoma should also be read a series of Cases of Misplaced, Malformed and Dislocated Lenses, in some of which Glaucomatous Symptoms Developed, published by Sir W. Bowman in *Ophthalmic Hospital Reports*, vol. v; and also his remarks in the discussion on glaucoma in the Section of Ophthalmology at the annual meeting of the British Medical Association held at Cambridge in 1880. In connection with the formation of an artificial pupil by iridodesis, etc., Mr. Hulke mentioned Sir W. Bowman's invention of a combined cutting needle and hook which enabled the operator to effect with one instru-

ment the corneal puncture and the seizure of the pupillary margin, instead of requiring for this both a cutting needle and also a hook, such as Tyrrell's. Sir William Bowman also had blunt iris hooks of the general form of Tyrrell's, and constructed of a flexible metal, so that the shape of the hook could be bent to any desired angle—a matter of much convenience when operating at the nasal side of the cornea. A paper on Artificial Pupil and the Needle Hook appeared in the *Medical Times and Gazette* in 1852. The Ophthalmological Society was under great obligations to Sir W. Bowman for his fostering care in its early years, and for the valuable addresses with which he opened its three first annual sessions. The esteem in which Bowman and his works were held wherever ophthalmology had votaries was shown by the acclamations which greeted his election to the president-ship of the Section in the International Congress held in London in 1881. Mr. Hulke, in conclusion, said that in the rapid advance of ocular surgery which the last half century had witnessed, their first president had in this country played a most important *role.—Brit. Med. Jour.*

OBITUARY.

ERNST ADOLF COCCIUS.†

Ernst Adolf Coccius was born September 19, 1825, at Knauthain near Leipzig. He began his studies in the city of the Muses, Leipzig, in which he spent the largest part of his life as investigator, teacher and physician; then he went to Prag, where clinical teaching in ophthalmology had been inaugurated by Johann Nepomuk Fischer, and been built up by Hasner and Arlt; finally he went to Paris, where in the middle of the century the studious disciples of Æsculapius used to travel, and where the modern French school of ophthalmology had been founded by our countryman, Sichel.

After his return from 1849 to 1857, Coccius was assistant and private docent, then until 1867 extraordinary, and from then until his death ordinary professor and director of the ophthalmological clinic of the university of Leipzig.

Coccius was an original investigator and full of new ideas, and was one of the founders of the ophthalmoscopic æra. When, 29 years ago, I first heard the lectures of my teacher, A. von Graefe, he had in his hands the ophthalmoscope of Coccius; with this instrument we made the first investigations in the direct method. In fact, when comparing the fundamental work of Helmholtz, of the year 1851, and that of Ruete, of 1852, with the one of Coccius in 1853, we cannot help being astonished at the progress made in the practical use of the instrument as a means of diagnosis of eye diseases. Its physiological part contains studies on the pulsation of the central retinal vein, on the degree of transparency of the retina, on the physiological color of the fundus of the eye, and

on the physiological conditions of the macula lutea. Here he describes the reflex of the fovea centralis, which was a discovery which proves the sharp eye of the discoverer. The pathological part contains not only some examples of the importance of the ophthalmoscope, as does the one in Ruete's book, but a complete description of the opacities of the refracting media and the alterations in the retina and choroid, and for the first time a true aid in the diagnosis of the internal eye diseases. The scientific standpoint to explain the appearances by means of the anatomy and physiology, is never lost sight of.

So does that other earlier work of Coccius, "On How the Cornea is Nourished," contain a multitude of original observations.

Referring to a pompous "discovery" of the last few years, I simply draw the reader's attention to page 102, note: "To simply lay a glass slide against the cornea with a drop of water is sufficient to render the retina visible."

In his inaugural lecture on glaucoma, inflammation and the autopsy with the ophthalmoscope (1859) he has also described minutely the later on "discovered" filtration scar in glaucoma, and for the first time given an account of newly-formed blood-vessels in the vitreous body.

Coccius was the first to dare to simplify the ophthalmometer of Helmholtz, and who worked with this instrument on the eye, not earlier than two years ago, yet he delighted us with important communications on this subject. He has also helped to improve the measuring of the refraction in the upright image, and made contributions to the knowledge of how to measure the intraocular tension, on injuries to the eye, on varioloid inflammation of the eyes, and on the visual purple.

To-day, even, every one may read with pleasure the report on the institution for poor eye-patients (Leipzig, 1870), especially the part on cataract-extraction, and on examining the fundus on polarized light.

Coccius was totally imbued with that humane feeling which makes the great physician. He was, furthermore, amiable to

the highest degree, and considering his position and his success, extremely modest.

Only two weeks ago, I received a friendly letter from him on some scientific matters. The news of his death came totally unexpected and shocking.

Ritterich, Ruete, Coccius, the representatives of the school of Leipzig, will continue to live in the memory of those after us.—J. HIRSCHBERG, in *Hirschberg's Centralblatt.*

FRANCOIS O. NODINE.†

As we go to press we are pained to hear of the death of Dr. Nodine, who died at sea on the steamer La Bourgoyne, from Havre, which arrived in New York November 24. Dr. Nodine was unmarried, 35 years old, and was born at Meadville, where his parents still live.

Dr. Nodine graduated from the Medical Department of Wooster University in 1880. The following year he spent in the hospitals in New York City. In 1881 he returned to Cleveland, and for three years was associated with Dr. D. B. Smith. For about two years he was Professor of Diseases of the Eye and Ear in the Medical Department of Wooster University.

Early last winter he fell a victim to "la grippe," and never fully recovered from that attack. Last August he sailed for Europe and located at Davos Platz in Switzerland, with the hopes of regaining his health.

In manner, Dr. Nodine was most affable, and of fine personal appearance. He was of a genial, social, sunny disposition, and always mingled with the very best society.—*Cleveland Med. Gaz.*